

CLAIMS:

1. A photoacoustic spectroscopy sample array vessel, comprising:
a vessel body having at least three sample cells connected to the vessel body;

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at least one acoustic detector acoustically coupled with the vessel body and
capable of receiving an acoustic signal from at least one sample cell.

2. The sample array vessel of claim 1, wherein the at least one acoustic
10 detector is connected to a photoacoustic spectroscopy system and is connectable to the
vessel body.

3. The sample array vessel of claim 1, wherein the acoustic detector
comprises a transducer.

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4. A photoacoustic spectroscopy sample array vessel, comprising:
a body having multiple sample cells for retaining samples, the multiple
sample cells being arranged in an n, m matrix with rows and columns; and

20 at least one acoustic detector acoustically coupled to the body to receive
acoustic waves from a sample in at least one sample cell.

5. The sample array vessel of claim 4, including at least 24 sample cells.

6. The sample array vessel of claim 4, including at least 96 sample cells.

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7. The sample array vessel of claim 4, including at least 384 sample
cells.

8. The sample array vessel of claim 4, including at least 864 sample
30 cells.

9. The sample array vessel of claim 4, including at least 1536 sample cells.

10. A sample array vessel for PAS analysis comprising:
5 a body having at least three sample wells for holding samples for PAS analysis; and
means for detecting acoustic signals that emanate from a sample in a sample well when the sample is exposed to an excitation source.

10 11. The sample array vessel of claim 10, wherein the means for detecting acoustic signals is connected to the sample array.

12. A method for PAS analysis of analytes in a solution, the method comprising:
15 providing a sample array vessel having a matrix of at least three sample cells, the sample cells retaining solutions therein;
exposing the solutions to a light beam to cause analytes in the solutions to emit acoustic signals; and
detecting the acoustic signals generated by analytes in the solutions.

20 13. The method of claim 12, wherein at least one transducer is used to detect the acoustic signals generated by the analytes.

25 14. A method for PAS analysis of analytes in at least one sample, comprising:
providing a microtiter plate having multiple sample wells;
filling at least one of the multiple sample wells with at least one sample for PAS analysis;
acoustically coupling at least one transducer with the microtiter plate;
30 exposing the at least one sample to a light beam to cause analytes in the at least one sample to emit acoustic signals; and

detecting the acoustic signals generated by analytes in the at least one sample.